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MANPOWER PLANNING IN RAILROAD MAINTENANCE WORK

UP TO 1965

- Germany -

by Kurt Freitag

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MANPOWER PLANNING IN RAILROAD MAINTENANCE WORK UP TO 1965

Following is a translation of a lecture by Vice-President Kurt Freitag, Dresden, at the Advanced Training Course of the section of the Chamber of Technology at the Dresden College for Transportation Affairs on 8 January 1960 dealing with "The Economically Most Effective Utilization of Manpower in Railroad Maintenance Work." The lecture was published in Deutsche Eisenbahntechnik (German Railroad Technology), Vol. VIII, No. 4, Berlin April 1960, pages 147-154.⁷

1. Survey on the Development of the Manpower Situation to Date and on the Tasks of the Seven-Year Plan

1.1 Superstructure

In the postwar years there has been, generally speaking, a manpower shortage as a result of the war, which will also be felt in the near future as a result of the decline in the birthrate during the war years and the early postwar years. Moreover, there is a relatively greater manpower demand in our republic than in the capitalist countries as a result of the socialist development of the economy, and as a result of the building of new and greater industries. It is obvious that these phenomena cannot but effect the field of railroad maintenance and here especially the track superstructure. Thus, in the field of railroad maintenance, too, the work demand accumulated as a result of the war and postwar phenomena must be overcome and, beyond that, the demands of economical operations and necessary advances must be handled with the available manpower.

Formerly, with almost exclusively manual work, 0.9-1.0 worker per one kilometer of existing track was the usual estimate. With the current state of mechanization and the condition of railroad tracks, one has to figure on a minimum of 0.7 worker per one kilometer. The workers included in construction units are not counted in the above-mentioned figures since these workers are utilized for tasks extending beyond Bezirk limits, as part of central superstructure renewal work.

Since no increase in the available manpower can be expected in the future, the fluctuation must be stopped by specialization of manpower with the goal of general recognition of the vocation of a "track builder" and the existing gaps must be closed by means of greater mechanization.

Especially for the special class and first class tracks a significant increase of annual thorough maintenance work must be achieved. In the area of the Dresden Reichsbahn directorate, plans call for an increase of regular maintenance to 595 kilometers annually in the above-mentioned categories as part of the reconstruction measures, so that there will be a three-year maintenance cycle, which must be considered as altogether satisfactory if achieved.

In addition to maintenance and improvement work, renewal work must be carried out under the Seven-Year Plan, especially in the area of the Dresden Reichsbahn Directorate, on the trunk lines of the area, in connection with the extensive electrification program. This renewal work requires regional concentration of available superstructure capacities. The most important project is the renewal and electrification of the Leipzig--Zwickau--Karl-Marx-Stadt--Dresden--Riesa--Leipzig line. The Seven-Year Plan provides for the renewal of 724 kilometers of track at a cost of 210.5 million Deutsche marks.

1.2 Bridges

With the organizational change of 1 April 1955, at first all solid bridges with more than 10 meters clear width and steel bridges with more than 10 meters width between supports, sizeable railroad stations, tunnels as well as patrollable signal bridges and arms, formerly maintained by the railroad maintenance shops, were taken over by the bridge maintenance shops.

Since 1 January 1959, bridges with clear widths of 2-10 meters in the Dresden Reichsbahn Directorate are also being supervised and maintained by the bridge maintenance shops. The greater efficiency resulting from this change is indicated in the transportation achievements in Table 1.

Table 1. Comparison of Plan Quotas for Transportation Achievement for 1956, 1959, and 1965

| Agency | 1956 | 1959 | 1965 |
|---------------------|-----------|-----------|-----------|
| Bridge Maintenance | | | |
| Shop (Brm) Dresden | 483,793 | 804,300 | 900,000 |
| Brm Karl-Marx-Stadt | 463,247 | 690,640 | 1,150,000 |
| Brm Plauen | 585,000 | 930,000 | 1,050,000 |
| Bridge Repair Shop | | | |
| (Brm) Dresden | 1,023,408 | 1,243,700 | 1,300,000 |
| Total Achievement | 2,555,448 | 3,668,640 | 4,400,000 |

The number of the own production workers per bridge maintenance shop in 1959 was twice that of 1956, about 60 per bridge maintenance shop. By 1965, the number of workers is to be increased to 100 workers each. Thus an increase in the shops' own output from 28 percent to 60 percent was achieved as early as 1959. Plans for 1965 provide for a further increase of the maintenance shops' own achievements to 85-90 percent.

The neglected recovery of the construction work during the past four decades has significantly contributed to a considerable loss of load capacity

and stability. The road consistently followed in the Two-Year Plan and in the Five-Year Plans by the Dresden Reichsbahn Directorate with regard to the thoroughgoing general repair of the solid bridges, which on the average are 80-100 years old, and with regard to the strengthening or renewal of the steel girders with an average age of from 40 to 60 years including their abutments and pillars--some of them are even older--must be continued on an increasing scale until 1965. For bridge construction, too, socialist reconstruction, that is the application of the most efficient techniques and methods of construction and the utilization of the creative initiative of all bridge builders, is the most important means for implementing these plan tasks.

This formulation of our goal makes it clear that the law of strictest economizing must prevail; economizing, but under no circumstances at the expense of quality.

1.3 Above-Ground Structures

Since 1 April 1955, the maintenance shops for above-ground construction have also become responsible for maintaining all buildings and installations in an orderly condition of construction or to put them in such a condition. The area of responsibility of a maintenance shop for above-ground construction corresponds to the size of a district (Amtsbezirk).

In 1957, by a change of definitions, the below-ground installations were removed from the sphere of responsibility of the maintenance shops for above-ground construction, so that the latter can now fully devote themselves to their main task, responsibility for maintaining above-ground structures and their stability. In 1956, 3,074,00 DM was available for transportation services, in 1959, 4,380,00 DM and by 1965 this sum will amount to as much as 4,800,000 DM. The building artisans taken over from the railroad maintenance shops at the time of the organizational change alone cannot do justice to the demands and to the development of the above-ground maintenance shops. Therefore, their number was considerably raised. To attain the main target of the Seven-Year Plan, the general repair of all above-ground installations and buildings, 30-35 special artisans must be recruited.

During the entire Nazi period and also to some extent during the postwar years, construction maintenance was looked upon as secondary. Therefore, not only the condition of construction work must be thoroughly repaired and improved, but, starting in 1966, the maintenance work must be carried out in a six-year maintenance cycle.

In the special field of above-ground construction, this target demands the consistent implementation of the principle of track repair according to plan, the implementation of reconstruction and preventive measures plans in the railroad offices, the observance of financial discipline as well as attainment of the highest quality level.

The introduction of the less-than-carload traffic center transportation entails the reconstruction of freight storage facilities. In the course of the Seven-Year Plan, 35 freight depots in the Dresden area must be so improved that operation by means of fork lifts can be instituted.

2. Use of Manpower

2.1 Superstructure

The condition of the track and switching installations in many areas is not yet satisfactory. The worse the condition of the track is, the more difficult is the task of maintaining the installations in an operationally safe condition. Interim maintenance work must be carried out since not all installations whose technical condition requires it can be exchanged and, on the other hand, operating measures, such as establishment of slow-speed sectors and blocking of lines, must be avoided as much as possible. This kind of work, since it is tantamount to patch work, is uneconomical and does not result in economic success.

Even though this kind of work is necessary and justified to some extent on account of the requirement of maintaining operational safety, everything must be done to limit it and to utilize the capacities for planned maintenance work. A justification for carrying out auxiliary work is present only in the case of emergency servicing and the maintenance of switch head locks (Weichen-spitzenverschluesse) according to plan; these latter types of work are included in interim maintenance work. However, in many cases it is still possible--and that is shown by the track strip charts-- to maintain tracks, which in most cases have been in position for a long time, by emergency servicing according to plan in such a manner that they will satisfy the demands placed on them.

In this connection, it should be mentioned that the present mechanization, particularly of the work processes ballast cleaning, packing, and tamping has not yet been solved in a satisfactory manner. The pledge of the colleagues of the REW /Railroad Development Plant?/ Blankenburg and the appeal for a competition, starting out from the promised delivery of 100 small track tamping machines which can be hoisted off the tracks, however, indicate the new feature in the development.

Of special importance is the formation of specialized and mechanized gangs for these types of work. Thus, e.g., the Magdeburg and Dresden Reichsbahn directorates established a special construction unit in 1959 which was equipped with vibration tamping tools and which carried out tamping work in multishift operations even over weekends.

The formation of gangs from two or three Bm's (railroad maintenance shops) into mechanized brigades, which are used beyond the assigned areas of a railroad maintenance shop, was proposed in the reconstruction plan, for example, of the Freiberg Bm.

In 1960, this procedure is supposed to be introduced in other Bm's, too. In this manner, the goal of increasing systematic maintenance work is to be reached. Maintenance work requiring much material in comparison to labor, such as replacement of rails, switches, tracks, and ties make up a considerable part of track maintenance. The execution of these types of work, which must not be neglected especially in districts with bad track conditions, frequently causes a great deal of concern, especially in the Bm's with the smallest number of workers.

In future, the administration for "Installations" of the Reichsbahn

directorates must help more than heretofore by the assignment of construction units or gangs which are housed in construction unit cars (Bauzugwagen). In this connection it should also be mentioned that the assignment of other labor is unsatisfactory and that the Dreis and Bezirk councils are not making available the superstructure capacities [manpower required for superstructure work?] according to the requirements of operational safety. The influence exercised by the Reichsbahn directorates in this respect is still inadequate.

The work connected with maintaining and increasing the value of investments is being performed by the construction units of the Reichsbahn directorates or by the construction management of the German Reichsbahn. The assignment of these capacities must take place more and more with faultlessly working large equipment according to an exactly predetermined technology. Only in this manner will it be possible to avoid all time losses and to achieve the goal of producing one kilometer of track (Gleis) in six hours. Of special importance for the economically most effective utilization of manpower in the Bm's is the introduction of bonus time wages (Praemienzeitlohn).

Findings On Performance Wages and Bonus Time Wages for Improvement of Quality

In the past, almost all railroad maintenance work was carried out under the performance wage system. Most of the work is directed toward the quantity-wise fulfillment of the work. To identify the quality of the performed work, the acceptance regulations for superstructure work were cited in the AzObv. [Appendix to the Superstructure Regulations?].

For a large part of the interim maintenance work, there were only inadequate quality standards or none at all. At the same time, these standards had large gaps in the evaluation of the systematic maintenance work.

As an extreme example it should be mentioned here that in the acceptance the individual check points were added and placed in a percentage relationship. Thus, if work of minor importance for the track installation was good and the work of vital operational importance (comparative grade, direction of track, impact position) was done in an inferior manner, there was nevertheless a very good acceptance check result.

However, higher speeds, greater axle loads, greater comfort of riding, etc. depend primarily on the quality and the condition of the lines. High quality of the superstructure therefore is the guarantee for safe, fast, and economical transportation of passengers and freight. However, this prerequisite can be fulfilled only if railroad maintenance is performed according to progressive methods and if the latest findings of technology and economics are included in the working methods and practices. This constant change and improvement of practices depends considerably on the consciousness of the working people and on the correct application of the objectively working social and economic laws. Therefore, the existing contradictions between quantitative achievement (performance wage) and qualitative result must be fundamentally solved with the aid of better application of the principle of material interest.

This fact makes it necessary for the wages of the railroad maintenance workers and those of the other production workers of the Bm's to be directly

linked to, and be made directly dependent on, the quality achieved in the work (bonus time wage system). According to the principles of the socialist pay system, such a dependence can be achieved only if appraisal of the quality is the complete or predominant measure of work performance.

To implement these findings fully, an improved regulation of quality evaluation in railroad maintenance work must be worked out, a uniform working time (for a specific operation), and pay according to the bonus time wage system. The necessary documentation was compiled by a working team in extensive work. This work was made more difficult primarily because no uniform work norms and technology were in existence. Technical-economic index figures had to be worked out from the multiplicity of variations.

In addition to preparing this uniform work documentation, the "New Working Method" was introduced on a trial basis in the Karl-Marx-Stadt Main Railroad Station Bm effective 1 April 1959; effective 1 October, it was introduced on a compulsory basis in all (railroad) maintenance offices of structural engineering.

By means of improved quality evaluation and by extensive consultations and discussions with railroad maintenance workers concerning the importance of the new working method, the following acceptance results could be achieved after a brief trial period:

| Quality | Apr-Jun 58 (in %) | Apr-Jun 59 (in %) |
|--------------|----------------------|----------------------|
| First order | 94.06 | 97.70 |
| Second order | 95.16 | 97.42 |
| Third order | 95.20 | (not done) |

While according to the former acceptance methods exclusively the quality of the installations was determined, the new directives for quality evaluation guarantee that the quality of the performed work is stressed. Thus the condition will be eliminated where the work gangs were made responsible even for such shortcomings which were neither caused by their work nor could be eliminated by them. The results show that a considerable improvement of the quality has taken place.

The new directives were seriously hampered by the former working method under the performance wage system with the great norm differences in all Bm's. The old norms were unrealistic, especially since the quality result was not taken into account. The above-mentioned working team had to determine the actually required working time according to the technologies and the required quality.

It is now no longer the task of the railroad maintenance workers to lower these standard work times significantly, but to make use of them to attain better quality. Of course, the progress of technology must be kept in mind in this connection. The colleagues are now able, with good work organization, to attain satisfactory quality as well as an increase in labor productivity. This is reflected in the pay through a higher bonus (DM per hour according to quality level).

Trial introduction of the standard work times in the Bm of the Karl-Marx-Stadt Main Railroad Station showed that they can be attained with good work organization. Average fulfillment from April to June 1959 amounted to 99.8-107.0 percent.

In Table 2 below, the results of some colleagues, picked out at random, are given. This listing shows that on the basis of the new working method in railroad maintenance work no wage decrease has taken place for the colleagues; on the contrary, there has been an increase in the gross earnings.

Table 2

| Name | April | | May | | June | |
|----------------|-------|------|------|------|------|------|
| | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 |
| Bua Albrecht | 422 | 439 | 414 | 428 | 408 | 440 |
| Strw Rupprecht | 383 | 403 | 376 | 419 | 357 | 448 |

Generally, it can be stated with regard to the trial introduction of the bonus time wage in the Bm of the Karl-Marx-Stadt Main Railroad Station plan fulfillment could be maintained, 1958 wages have been reached, or even somewhat surpassed, but the quality has improved considerably and labor productivity has not dropped.

Through the introduction of the new pay system, the following is being achieved:

- 1-- The quality of the superstructure is being considerably improved;
- 2-- An exceeding of the wage fund will be hardly possible;
- 3-- Socialist team work can be introduced more easily because the entire work gang is being assigned to a joint task;
- 4-- The differences in the development of the norms are being stopped;
- 5-- From an overall view, the economically most effective utilization of manpower in railroad maintenance is guaranteed.

As a further step in the measurement of quality, what remains to be improved is the evaluation of the condition of the installations, in other words of the entire line and the installations and not merely the work performed at a given time.

2.2 Bridges

The performance of repair work on solid construction parts is the task of the bridge maintenance shops, while repair work on steel structures is performed by the bridge repair shop. The target dates or the sequence of the bridges and art structures to be repaired are set according to the priorities assigned by the inspectors. A constant increase of our own achievements must be attained with all available means. In the maintenance work of the steel girders, the painting program must be treated as an especially important point. Here, too, the goal must be a regular cycle, which, according to former experiences, is twelve years and which, in our opinion, is again appropriate with the present quality of paint and with satisfactory rust removal and painting techniques.

With the restriction on the work performed by the bridge maintenance shops the latter cannot establish their own painting brigades and since the bridge repair shops cannot add to their available painting capacity, the bridge maintenance shops must see to it that the Kreis councils make available to them the required manpower.

Transition from Performance Wages to Bonus Time Wages for Quality Improvement

The most expeditious and conscientious elimination of bridge damages is the prerequisite to the gradual decrease of general repairs and replacement investments and thus would be a very economical measure.

To attain a normal six-year maintenance cycle by the end of the Seven-Year Plan, the bridge maintenance shops in particular must exert all their efforts to commit appropriate non-railroad capacities (presumably manpower) for railroad section maintenance. In future, 60 percent of the total maintenance work is to be carried out as section maintenance work. The formation of a complex construction unit will significantly contribute to this end.

The responsibility of the foreman will be considerably increased as these measures are being put into practice. Through the introduction of performance wages in bridge maintenance, the foreman was primarily busy with bookkeeping on construction projects. The reason for that was that only in very rare cases was the work on one structure repeated in exactly the same manner.

As a result, realistic technically justified work norms, the basis of a satisfactory performance wage calculation, were missing. Unrealistic norms led to unrealistic calculations, and in many cases to the lowering of the quality of the work.

For this reason, the bridge maintenance shops have welcomed the introduction of the bonus time wage. Already in the early months it has been demonstrated that, with the same quantity of output, a considerable qualitative improvement of the work is taking place. Simultaneously, a considerable burden has been removed from the foremen by reducing their extensive record keeping. A reduction of the earnings of the production workers did not take place; on the contrary, the average earnings increased somewhat compared to the corresponding period last year.

2.3 Above-Ground Construction

The generally bad construction condition of the above-ground structures, mentioned in the beginning, entailed a sporadic working method of the above-ground construction maintenance shops until 1957-1958. At first, the most important repairs on roofs, windows, furnaces, etc, had to be carried out without anyone being able to see any systematic work in that. This "fire brigade work" has been largely overcome and is being more and more replaced by systematic maintenance work.

In systematic maintenance work, the above-ground construction inspectors give extensive instructions and support and determine the priorities. They control in a 6-year cycle supporting steel and wood construction parts of loco-

motive shed roofs, shop, etc., generally exercise state construction supervision, and are present at the times of acceptance of rough structures and of completed structures.

Control over the guarantee periods is an important means for the implementation of the economy regime and is being carried out by all above-ground construction maintenance shops.

Since the construction industry is being centrally managed by the Bezirk councils, there has been a noticeable reduction in the contribution of the construction trade toward the maintenance work of the above-ground construction maintenance shops. This makes it clear that an increase of the latter's own performance is an urgent necessity.

To carry out a construction project with one's own efforts has the advantage that the various skilled craftsmen are available at all times and can be utilized continuously. While in 1957 construction projects only up to 8,000 DM were carried out by the maintenance shops themselves, now this figure has been raised to 30,000 DM. In this manner, the dependence on firms with regard to beginning and completion of construction has been limited and better and more continuous plan fulfillment has been assured. The section-by-section improvement of the above-ground installations cannot be separated from the idea of systematic maintenance. The present long-range plan is being carried out with the goal of repairing all above-ground structures at least once by 1965. Of special importance in this connection is the formation of complex brigades, which--equipped with modern equipment and tools-- will be best able to attain a good condition of our above-ground structures through systematic maintenance.

In the management documents of the above-ground construction maintenance shops the shares of transportation work were fixed which these shops have to use for this purpose. They are: In 1960, 59 percent; 1961, 65 percent; 1962, 70 percent; 1963, 74 percent; 1964, 77 percent; and 1965, 80 percent.

The successful carrying out of the first-time repair of all buildings will be the basis for the fact that in subsequent years much fewer repairs will occur than has so far been the case as a result of the decade-long neglect of the above-ground structures.

The German Reichsbahn, as the greatest transportation system of the GDR, has already found recognition through the construction of rail vehicles. Now its task is to bring the buildings of the railroad stations and those along the lines up to this level.

In systematic maintenance, modernization is stressed, which is already a manifestation of quality improvement. Therefore, the introduction of a new working method in the above-ground construction maintenance shops had become necessary and was welcomed by the offices concerned. In this new working method, the quality of the work will be decisively stressed, the foreman's former recordkeeping work will be noticeably lessened and he will be able to exercise his supervision and control function.

3. Characteristics of the Assignment of Construction Units

3.1 Superstructure

Construction units are mainly assigned to extensive centrally managed construction projects. Depending upon the size of the construction site, several construction units may work on one construction project. As a rule, they consist of two to four maintenance shops with 50-80 workers each, which are headed by a shift foreman. In addition, there are two to three foremen in each maintenance shop who lead the work gangs. The working time is 9 days of 10 hours each, followed by 5 days off for the trip home. In other words, work is performed by a shift system. This guarantees that construction progresses uninterruptedly and the machine capacities are being utilized. Furthermore, economical use of the large equipment, such as ballast cleaning machine, track-laying crane car, individual concrete-part and concrete-trestle laying devices, roadbed rollers, crane for switch construction, and tamping machine, is possible only if these implements can be used on a continuous basis.

By having large machinery, there is a guarantee that construction projects which entail the blocking of lines (partial or all the way) can be completed in a very short time and that the tracks in question will be available for operations (without undue delay). In this manner, the plan for improvement of superstructures is being fulfilled simultaneously.

The material circulation plan, i.e. the installation of the new materials and the removal and simultaneous loading of the extracted materials, must be coordinated with these assignments. What is important is that the removed materials are needed for maintenance work.

3.2 Bridges

Even greater attention than heretofore must be attached to the formation of a mechanized complex construction unit, made up of brigades of the bridge maintenance shops and the bridge repair shops.

This unit is to be utilized especially for more rapid catching up with the backlog in maintenance of trunk lines up to 1961; from 1962 to 1965 it is to be used for regular rotation work.

This complex construction unit is to consist of the following:

- 1 Construction unit leader
- 1 Foreman for steel construction
- 1 Foreman for solid construction
- 2 steel construction gangs with 4 skilled workers each
- 2 Helpers
- 1 machinist
- 3 solid-construction gangs with 4 masons each
- 1 auxiliary worker
- 1 cleaning gang with 3 bridge cleaners
- 1 "Springer" gang with 3 carpenters
- 1 Polyvinyl chloride welder
- 1 Compressor maintenance man

Furthermore, provisions are made for four safety guards. These workers as well as the required machines and equipment are being made available in the proper ratio by the bridge service offices.

The complex construction unit is to be used as follows:

Before the structures are gone over, the bridge cleaners of the construction unit are utilized. In the case of steel bridges, there follow, depending on the extent of the repair work, one or two steel construction gangs and a solid-construction gang which is to be used for the repair of solid-construction parts of steel bridges. Occasionally it will be proper to have the solid-construction parts gang work ahead of the steel construction gang. For the repair of solid-construction parts two gangs are provided. The carpenters, the safety guards, and the polyvinyl chloride welder are being assigned as needed to the steel or solid-construction gangs.

Likewise the bridge cleaners could be temporarily attached to the steel and solid-construction gangs. Moreover, it is planned that the bridge repair shop, after the conclusion of repair work on steel construction parts by the complex construction unit, will carry out on its own resources the required repair work of the painting.

3.3 Above-Ground Construction

The use of trailers and repair trucks will considerably improve and facilitate the work of the complex brigades. By traveling to distant places of our areas, time is lost, though such loss may be slight.

In special cases, the complex brigades working in various places can in a very short time be combined into a mechanized, mobile above-ground construction "Maintenance Shop", which can participate in an effective utilization of manpower at a sizable object.

4. Reduction of Idle Time

4.1 Superstructure

To raise labor productivity, one of the most important tasks is the reduction of idle and down times. Utilization of the reserves here is therefore of special importance.

A special part of the down time, particularly in the execution of maintenance work, is made up of such time losses which originate from bad work organization and from the operations. This includes for example waiting times resulting from temporary unblocking of the blocked section, Az-locomotive and railroad car positioning and the like. Such waiting times also occur on a large scale in using machines and large equipment. Here it is the task of the Reichsbahn directorates to reduce the idle times to a minimum by good cooperation of the appropriate administrations. The result of the utilization times at the Dresden Reichsbahn Directorate in 1959, with a utilization coefficient of from 0.2 to 0.6, is very unsatisfactory, particularly because this figure is based on 45 hours of weekly use.

The railroad maintenance shops, too, can have a great influence on these idle times by good cooperation with the railroad station concerned, etc. To avoid such waiting periods in the case of large construction projects in which large pieces of equipment are to be used, it will be necessary to procure special diesel locomotives which will be at the disposal of the construction management.

Of great assistance in the reduction of idle and waiting times was the procurement of SKL (self-propelled small rail vehicle?) for each railroad maintenance shop. Thus it was possible for example in the area of the Dresden Reichsbahn directorate, to start equipping the first railroad maintenance shops with a second SKL. Many uneconomical transports with hand-operated KL (small rail vehicles?) could be avoided. A railroad maintenance shop without SKL is hardly imaginable today. Our railroad maintenance workers want this help under all circumstances and if there is trouble with the SKL quick repair is frequently necessary.

For superstructure work, too, road trailers were purchased and used, first of all for the welders. In future, efforts must be made, more than heretofore to obtain railbound sleeping cars. If the workers can be accommodated directly at the place of work, a great part of the transportation and running times will disappear.

It is not insignificant in this connection that in every case satisfactorily working equipment and machines are available. It has frequently happened that the failure of, for example, a tamping machine has caused idle times which could be made up only with the most strenuous efforts or not at all. Therefore, it must be our task to deliver satisfactorily maintained and repaired machines to the construction sites and to organize the exchange of broken down machines, so that the idle times can be avoided. This is a great task for the GBS.

In the Dresden Reichsbahn Directorate this is supposed to be organized in such a manner that according to a definite plan all machines from one railroad maintenance shop are picked up by the GBS, the railroad maintenance shop temporarily receives other machines and after the completion of the overhauling the machines are again exchanged. The machine maintenance man of the appropriate railroad maintenance shop are to be assigned for a definite period of time to the GBS to supplement their qualifications. This measure will also help reduce idle time.

The planned large construction units will get repair bases of their own with trained artisans.

4.2 Bridges -- Reduction of Down Times

The bridge maintenance shops have strict orders to offer machines and equipment not being utilized because there is no opportunity to use them to other bridge maintenance shops in the Reichsbahn directorate area.

Other possibilities for lowering idle time will be available starting in 1961 with the assignment of complex construction units.

Application of the Seifert method in conjunction with the introduction of the bonus time wage system is also of decisive importance for bridge maintenance. The Seifert method is being applied in the brigades of the bridge maintenance shops and is being popularized among the brigades by the authorized personnel of the offices, and the records concerning idle times are being Analyzed.

4.3 Above-Ground Construction

One of these measures to reduce idle time is the formation of complex brigades in above-ground construction work. The consistent implementation of the brigade tasks makes possible the economically most effective assignment of manpower to systematic maintenance work while making full use of the working day and available machines. Aware of this fact, the existing complex brigades are being strengthened with manpower available in the above-ground construction maintenance shops and additional brigades are being formed. For these brigades, the preparations for the construction measures to be carried out by them form the basis of continuous work. This includes timely and thorough preparation of lists of work to be carried out, including material requirements, completion of preparatory shop work prior to the beginning of work at the construction site, and delivery of material to the construction site.

The consequences of these measures are that the shops can change over to centralized production of wood products, prefabricated concrete parts, and plumbing and electrical installation material whose production takes place during the preceding months and which require only final assembly at the time when the construction is to be carried out.

Furthermore, construction schedules are set up which provide information on the utilization of scaffolding and construction machines in order to avoid idle times. All above-ground construction maintenance shops will complete these above-mentioned measures no later than January 1960 for the 1960 plan work.

5. Influence of Mechanization

5.1 Superstructure

The first stage of mechanization is the replacement or simplification of physical work by machines. To cite just one example, we have therefore developed and procured a motorized rail saw to mechanize the cutting of rails even though the number of rail cuttings is so small in the railroad maintenance shops that the capacity can be utilized only inadequately. The conditions are similar with regard to screw (-cutting?) and drilling work.

Repetitive work processes result in the greatest economic benefit when mechanized. The tamping of the ties constitutes the major share of the individual work processes in the superstructure work as a whole. In all superstructure work, whether it be track renewal, systematic repair, replacement of a switch, or the elimination of a mistake in the alignment of the track position as part of interim maintenance, ties must always be tamped once or several times.

You know of our efforts to develop various types of machines for the tamping of ties. Fully automatic track tamping machines were procured, which have functioned excellently for example in track renewal, that is to say when the tracks were completely blocked. In spite of their high capacity the use of these tamping machines causes difficulties on operating tracks, since the interruption of the use of the machine, or its removal from the track section and the waiting for the next blocking intervals requires precious time.

Therefore, we must direct our attention toward machines which can easily be removed from the tracks. The utilization of the O-series this year will prove whether or not the development of the light tamping machine of the REW Blankenburg will fulfill our expectations.

With a 5-piece vibration tamping tool set, 0.35 DM is saved per one meter of tamped track as compared to manual labor. Per one meter of track 0.18 hours less is used. For a two-piece small tamping machine tool set of the REW the saving increases to 0.88 DM per meter, and the required time is reduced by 0.38 hours per meter as compared to manual labor.

As small as the per-unit figures may be, they prove, however, that considerable sums and manpower requirements can be saved in case of wide utilization and if a struggle is conducted for great achievements. In one Reichsbahn directorate alone, 1.4 million fewer hours will be used for tamping from 1960 to 1965 than if the work were done manually. This corresponds to the strength of a medium construction unit.

The large pieces of equipment yield a higher per-unit profit. However, to be used, they require an exact technology, since they rarely operate by themselves but in conjunction with other equipment. Moreover, they require a certain number of workers for operating them as well as the performance of the simultaneously running other work. Prerequisites as a rule are sufficiently strong construction units and large construction sections which make high machine achievements possible. Since this machine work has a considerable influence on the operations, its use in maintenance work is not always productive. This evaluation however, refers exclusively to utilization for construction purposes. However, we must look at these questions individually in the larger context of the entire railroad operation. Construction is not a purpose in itself.

It is our goal to mechanize track renewal completely and to lay down complete trestles (Joche). Assembly places for these trestles must be set up. All work can be carried out mechanically from the assembly place to the laying. The assembly place has the advantage of being located in a fixed position. Thus it will be possible to equip it with machines adapted to fully mechanical operation of the unloading of material, the assembly into complete trestles, and their loading. The laying of complete trestles greatly reduces physical labor.

The planned reduction of the manday requirements for the renewal of one kilometer of track from 1,430 to 700 mandays is the result of the trestle-like laying of tracks and the use of large equipment for the work to be carried out simultaneously (such as roadbed cleaning).

The number of mechanical appliances, which grows from year to year, requires good guidance for utilization and strict supervision. In the Reichsbahn directorates and in the main administration, dispatcher services were set up which control systematic utilization of manpower and which intervene in cases of disturbances and difficulties.

The use of machines no longer permits sporadic work. The working methods and availability of machines must be planned way ahead of time. Mechanization requires systematic work. Mechanization demands re-thinking, leads to new approaches. The former limitation of the maintenance districts of a railroad maintenance shop loses its justification once mechanized equipment is being used.

Apart from the higher output it must be taken into account that the machine capacity is fully utilized.

The manpower demand, which as a rule cannot be covered by a single railroad maintenance shop, is derived from the machine output in single, or if possible multi-, shift operation. The manpower of several railroad maintenance shops must be brought together and sizable connected sections must be worked jointly.

Mechanization has not yet been concluded by far. Experience has shown that either high-capacity equipment must be created, which makes possible work on tracks in a very short time or that equipment must be developed which works outside the limits of the clearance. The replacement of manual work by mechanical work has almost been completed in some partial work processes. Drilling, cutting, tamping, milling, and planing has been mechanized for maintenance work. As long as no new forms of maintenance are found, a stage of development is reached after delivery of sufficient pieces of equipment and limitation of types. Maintenance work in future, too, will only be partially mechanized.

Rail renewal or exchange must be looked upon from a different point of view. Here full mechanization was attempted; the first trials were held in Weida in 1959 with the testing of the Blankenburg trestle-laying device. It is likely that we can consider this problem as solved in the near future.

5.2 Bridges

It is the goal to equip the bridge maintenance shops in such a manner that demolition work and seam chiseling work (Fugenausstemmarbeiten) in future can be carried out only with pneumatic tools, so that in maintenance work, too, the heavy work can be significantly eased. The mechanization measures will affect the quality of the performed work in the next few years. In this connection, heavy emphasis will be placed on the equipment of the complex construction unit.

Extensive changes are also planned in the Dresden bridge maintenance shop. For this organization, the procurement of a concrete-block forming machine and of a jarring table is planned for 1960. A freight shed which is becoming empty is earmarked for placing these machines for the time being; the shed is getting empty through the establishment of the less-than-carload freight traffic center railroad stations. After receipt of the machines, the Dresden Bridge Maintenance Shop is supposed to start the production of prefabricated concrete parts, such as cover plates, sidewalk slabs, and later on perhaps of track beds as prefabricated parts. However, these are questions which must be coordinated with the local construction industry and also with our Reichsbahn construction enterprise.

5.3 Above-Ground Construction

By the end of 1961, small implements will be made ready in above-ground construction for all artisan groups -- as far as funds are available -- which will put these groups into a position to accomplish economically more effective achievements. From that time on it is planned to recondition, or, if feasible,

replace machines which are no longer satisfactory with respect to accident prevention. Special attention is directed toward the equipment of maintenance and equipment vehicles.

6. Influence of Competitions and Innovator Methods

6.1 Superstructure

In fulfilling the demand of the Fifth Party Congress of the SED, "to develop the GDR economy within a few years in such a manner that the superiority of the socialist order over the capitalist rule will be comprehensively proven," socialist competition coupled with the broad application of the innovator methods plays a vital role.

Coordination of the multiplicity of past competition into one intra-plant competition with the participation of all production workers of the construction office is the prerequisite for the achievement of the competition goals and for better supervision of the latter.

In mass competition maximum value is placed on an explanation of means and methods by which the economic results were achieved in intra-plant competition and of the development of mass-political work in the area of the offices of the administration of railroad installations. The socialist competition must direct its attention to the new development and must contribute to making the new prevail in the struggle.

At this time, the new manifests itself primarily in the socialist work teams and in the socialist work brigades. The brigades, which have the goal to work, learn, and live in a socialist manner and which have thus expressed their readiness to achieve the best work results in the collective and to do the work consciously, possess a decisive influence on the fulfillment of the economic tasks.

In this connection, cooperation between the workers and the technical intelligentsia plays quite an important role. Theory and practice form one inseparable unit, where one is unthinkable without the other.

Socialist competition, the innovator movement, and the movement of the rationalizers and inventors, all belong together inseparably as important forms of mass initiative in socialist production. The fulfillment of the great tasks of the railroad maintenance service to a decisive degree depends on the implementation of this inseparable unity. As an example I would like to cite the task assumed by a socialist work team in the Magdeburg Reichsbahn directorate, which has undertaken the task to reduce the manpower requirements for one kilometer of track renewal to 700 mandays by 1961 instead of by 1965.

6.2 Bridges

The increase of the steel construction capacity of the Dresden Bridge Maintenance Shop was mentioned as an especially good example, a success which was achieved to a significant extent by means of the implementation of numerous improvement suggestions and innovator methods. Plan control every tenth day, that is the slogan of the competition appeal of the colleagues of the REW Blankenburg. Implementation of such plan control is an important step toward the general improvement of the course of construction in 1960.

7. Improving the Qualifications of the Workers

7.1 Superstructure

The social and technical qualification of our workers is a factor which must not be underestimated in view of the tremendous tasks facing us. In this respect, it is especially the multiple qualification which must be designed to guarantee an economically effective use of manpower in railroad maintenance.

Thus, for example, construction maintenance workers are being trained as work-gang truck driver, welders, light car drivers, and work-train conductors (Arbeitszugfuhrer); the machine maintenance men will obtain the qualifications of track maintenance men.

In addition to multiple qualification, the training of suitable youths is one of the most urgent tasks in connection with the fulfillment of our plans. Maximum attention is to be paid to the training of machinists, foremen, and engineers in addition to recruiting youths for the vocation of a track builder so that manpower suitable for stepped-up mechanization and utilization of large equipment will be available.

7.2 Bridges

Because of the constantly growing mechanization, the bridge maintenance shops will have to place special emphasis on the qualification of machine maintenance men. In addition, the bridge maintenance shops will increasingly change over to performing sealing work by means of polyvinyl chloride foil. For this purpose, the appropriate skilled workers must be trained at the Wittenberge Experimental Institute for Welding Technique.

In the Dresden Bridge Repair Shop, the constantly growing welding capacity necessitates the qualification of metalworkers as welders. In 1960, the following will be trained in the Wittenberge Institute: 4 gas welders, 2 arc welders, 1 pipe welder, 4 acetylene cutters, 3 under-powder welders. Moreover, engineers and graduate engineers are currently acquiring the qualifications of welding engineers.

A special shortage in the qualification of foremen M III for the special field of bridge building occurred because in the past there had been only an M III training for foremen of the specialized field of superstructure at the Engineering School for Railroading.

Therefore, a curriculum for foremen M III training in the specialized field of bridge building was prepared with the cooperation of the Engineering School for Railroading and was submitted to the Ministry of Transportation for approval so that the training of these foremen can be started no later than September 1960.

7.3 Above-Ground Construction

The courses for foremen of the above-ground construction maintenance shops carried out in 1959 and 1960 serve the field of above-ground construction. Within this period, 38 colleagues of the Dresden Reichsbahn Directorate were

able to prove their proficiency as foremen M II in above-ground construction. The training of the plumbers as plastic welders has been about 75 percent completed.

Furthermore, the painters are obtaining the qualifications of plasterers (Putzer) so that they can properly take care of small plastering work by themselves in a proper manner. Some masons are to be trained to lay flagstones and to set up ovens (Grundofen).

Our goal is also to train roofers so that they can correctly put on roof boarding or roof shingles. Plumbers should perform simple locksmith work on buildings.

In conclusion I would like to emphasize especially the following. Application of the latest technology and mechanization are decisive for the economically most effective utilization of manpower in railroad maintenance work. The problems which arise must be discussed and settled in the socialist work teams.

We also must continue to improve our management work by relying more heavily than heretofore on the creative initiative of our workers and engineers. Together with our working people we are everything, separated from them we are nothing.

Summary

The greater tasks of the Seven-Year Plan, with a constant number of workers, require the introduction of the cycle system in railroad maintenance work. Reduction of auxiliary work, and increase of work according to plan on the tracks makes the assignment of the workers more effective. The proper application of the principles of material interest leads to qualitative improvement of the installations. Change-over from performance wages to bonus time wages. The importance of the continuous shift system and concentration of the construction units to speed up the progress of construction. Uncovering of manpower reserves by reducing idle and waiting periods. Increasing the utilization time of the equipment through qualification and introduction of the multiple-shift system. Extent of saving of manpower by utilizing vibration tampers as an example. Changing over to trestle-like laying of track in track renewal, a vital contribution to the lowering of manpower requirements from 1,430 to 700 mandays per kilometer during the Seven-Year Plan. Establishment of mechanized special work gangs without regard to railroad maintenance shop areas leads to better utilization of the capacity of the equipment and thus to capacity increase. The influence of socialist work teams and of the socialist work brigades on the results of railroad maintenance work. Characteristics of multiple qualification in railroad maintenance work.

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